What is claimed is:

1. An optical path switching device wherein optical code division multiplexing signals multiplexed with code are input from a plurality of input circuits, signals of each code in the optical code division multiplexing signals are switched, and output to a plurality of output circuits, comprising:

a plurality of despreaders provided to the number of codes corresponding to each input circuit, and capable of selecting all of the codes in the circuits;

a plurality of spreaders that are supplied with signals selected by despreaders in one-to-one correspondence with themselves, and apply fixed allocation code to these signals; and

a combiner that is provided on each output circuit and outputs to the output circuit by combining signals from a plurality of spreaders corresponding to this output circuit.

2. An optical path switching device in which the construction of the optical path switching device of claim 1 is constructed as a cascade connection of at least two stages.

3. The optical path switching device according to claim 1 that inputs optical code for the division multiplexing signals of different wavelength from each input circuit and that outputs optical code division multiplexing signals of different wavelength on to each output circuit, respectively provided with tunable wavelength converters on

the connection paths of corresponding said despreaders and said spreaders of the final stage.

4. An optical path switching device wherein optical code division multiplexing signals multiplexed with K codes (K is a positive integer) are input from N input circuits (N is a positive integer) and signals of each code in the optical code division multiplexing signals are switched and output to N output circuits, comprising:

N × N × K despreaders that are changed over between a code-selected condition and a disconnection condition;

a signal distribution section whereby the N input optical code division multiplexing signals from each of the input circuits are distributed and supplied to all the despreaders;

N × K spreaders whose output destination output circuits are fixed and that confer fixed allocation code on the outputs from each of the despreaders; and

a connection section that connects the N despreaders which have different input optical code division multiplexing signals with each spreader such that their output signals are combined.

5. The optical path switching device according to claim 4 that inputs optical code division multiplexing signals of different wavelength from each of said input circuits and outputs optical code division multiplexing signals of different wavelength to each of said output

circuits, comprising wavelength converters respectively on the connection paths of the N said despreaders and said spreaders.

6. An optical path switching device comprising an optical path switching device body having a construction which is the same as that of the optical path switching device according to claim 3;

a wavelength demultiplexing section that demultiplexes input optical code division multiplexing/wavelength multiplexing signals into optical code division multiplexing signals of each wavelength component and inputs these to said optical path switching device body; and

a wavelength multiplexing section that wavelength-multiplexes the optical code division multiplexing signals of each wavelength component output from said optical path switching device body.

7. An optical path switching device comprising a wavelength multiplexing path switching device comprising a wavelength demultiplexing section, an optical switch and wavelength multiplexing section; and

a code path switching device having the same construction as the optical path switching device according to claim 3, connected to some of the input/output ports of said optical switch of this wavelength multiplexing path switching device.

8. The optical path switching device according to claim 7 comprising a path control section that, in the event that it is necessary to change over a prescribed path, performs changeover at said code path switching device side to an evacuation path, then, at said wavelength multiplexing path switching device side, performs changeover of the faulty path to a new path, and finally performs path control such that the path that was avoided at said code path switching device side is returned to a new path.

9. The optical path switching device according to claim 7 further comprising:

a router section constituting the transmission source and transmission destination of signals; and

an optical code division multiplexing transmitter and receiver that performs the function of interfacing this router section and said code path switching device, between this router section and said code path switching device.

10. An optical path switching device comprising an optical path switching device body having a construction which is the same as that of the optical path switching device according to claim 5;

a wavelength demultiplexing section that demultiplexes input optical code division multiplexing/wavelength multiplexing signals into optical code division multiplexing signals of each wavelength component and inputs these to said optical path switching device body; and

a wavelength multiplexing section that wavelength-multiplexes the optical code division multiplexing signals of each wavelength component output from said optical path switching device body.

11. An optical path switching device comprising a wavelength multiplexing path switching device comprising a wavelength demultiplexing section, an optical switch and wavelength multiplexing section; and

a code path switching device having the same construction as the optical path switching device according to claim 5, connected to some of the input/output ports of said optical switch of this wavelength multiplexing path switching device.

12. The optical path switching device according to claim 11 comprising a path control section that, in the event that it is necessary to change over a prescribed path, performs changeover at said code path switching device side to an evacuation path, then, at said wavelength multiplexing path switching device side, performs changeover of the faulty path to a new path, and finally performs path control such that the path that was avoided at said code path switching device side is returned to a new path.

13. The optical path switching device according to claim 11 further comprising:

a router section constituting the transmission source and transmission destination of signals; and

an optical code division multiplexing transmitter and receiver that performs the function of interfacing this router section and said code path switching device, between this router section and said code path switching device.

14. An optical path switching device comprising:

a branching section that branches and respectively outputs optical code division multiplexing signals input from an input circuit to branched optical signals;

a spectrum despreading section coupled with said branching section that respectively subjects said branched optical signals to spectrum despreading processing with spreading code respectively set from outside and respectively outputs said optical signals that have been subjected to spectrum despreading processing;

a spreading section coupled with said spectrum despreading section that respectively performs spectrum spreading processing on said optical signals that have been subjected to spectrum despreading processing, with a fixed spreading code, and respectively outputs the optical signals that have thus been subjected to spectrum spreading processing, respectively having said fixed spreading code; and

a combining section coupled with said spreading section that performs code division multiplexing on said optical signals that have been subjected to spectrum spreading

processing and respectively outputs these to an output circuit.

15. The optical path switching device according to claim 14, wherein said branching section, said spectrum despreading section, said spreader section and said combining section are coupled so as to be capable, by setting a new spreading code in said spectrum despreading section, of designating an output circuit whereby an optical signal relating to said new spreading code selected from said branched optical signal is output.

16. The optical path switching device according to claim 14, comprising a respective plurality of said input circuits and output circuits;

said branching section comprising a plurality of branch elements, said respective branched elements being coupled in one-to-one relationship with said input circuits;

said spectrum despreading sections comprising despreader stages respectively provided corresponding to respective said branch elements;

said respective despreader stages respectively comprising a plurality of despreaders respectively individually coupled to corresponding output ports of the branch elements;

said combining sections comprising a plurality of combining elements, said respective combining elements being coupled in one-to-one relationship with said output circuits,

mutually different spreading coefficients being selectively set for each despreader belonging to the respective despreader stages; and

said spreading sections comprising spreading stages respectively provided corresponding respectively to said combining elements, said spreading stages comprising a plurality of spreaders respectively individually coupled to corresponding input ports of the combining elements, the spreaders respectively belonging to said spreader stages being respectively coupled with a single despreader belonging to one or other mutually different despreader stage and the spreading coefficients of the spreaders belonging to the respective spreader sections being fixed to be mutually different.

17. The optical path switching device according to claim 14, wherein, taking the respective numbers of said input circuits and output circuits as being N,

if N is an integer of 2 or more and K is an integer of 2 or more,

said branch elements are branch elements of the type with one input and K outputs,

there are provided N of these branch elements,

there are provided K said despreaders,

said combining elements are combining elements of the type provided with K inputs and one output,

there are provided N of these combining elements, and

the number of said despreaders is K and there are provided K said spreaders.

18. The optical path switching device according to claim 16, wherein there are provided between the said despreaders and said spreaders wavelength converters that output with converted wavelength said input optical signals that have been subjected to spectrum despreading processing.

19. The optical path switching device according to claim 16, wherein an input stage amplifier is provided between said input circuits and said branch elements.

20. The optical path switching device according to claim 16, wherein an output stage amplifier is provided between said output circuits and said combining elements.

21. The optical path switching device according to claim 16, wherein an input stage amplifier is provided between said input circuits and said branch elements.

22. The optical path switching device according to claim 18, comprising an optical switch having a plurality of main input ports provided for each wavelength component of the optical signal, a plurality of main output ports provided for each wavelength component of the optical signal, a plurality of auxiliary output ports respectively connected to respective said input circuits, and a plurality of auxiliary input ports respectively connected to respective said output circuits;

respective said main input ports being connected with respective said auxiliary output ports such that the optical signals of each wavelength component can be allocated to said input circuits; and

respective said auxiliary input ports and respective said main output ports are coupled such that changeover of the optical signal path therebetween from said output circuits can be effected.

23. The optical path switching device according to claim 22, comprising a wavelength demultiplexing section and said main output port wavelength multiplexing section coupled with said main input port,

wherein this wavelength demultiplexing section demultiplexes the incoming wavelength multiplexing optical signal arriving through the input side optical fiber into optical signals of each wavelength component, and sends these demultiplexed optical signals individually to respective said main input ports;

said wavelength multiplexing section performs wavelength multiplexing of the optical signals of each wavelength component from respective said main output ports and outputs these to an output side optical fiber; and

said optical switch, wavelength demultiplexing section and wavelength multiplexing section constitute a WDM-optical cross connector section.

24. The optical path switching device according to claim 22, wherein a tunable wavelength converter is provided between one or other of between said auxiliary output port and input circuit and between said auxiliary input port and output circuit.

25. An optical path switching device comprising:

a first code switching section comprising:

a front stage side branching section that branches optical code division multiplexing signals input from an input port to branched optical signals and respectively outputs said branched optical signals;

a front stage side spectrum despreading section coupled with this front stage side branching section, that performs respective spectrum despreading processing on the branched optical signals with spreading code respectively set from outside and that respectively outputs optical signals subjected to spectrum despreading processing;

a front stage side spreader section coupled with said front stage side spectrum despreading section, that performs respective spectrum spreading processing on said optical signals that have been subjected to spectrum despreading processing with a fixed spreading code and that respectively outputs optical signals subjected to spectrum spreading processing having these respectively fixed spreading codes; and

a front stage side combining section coupled with said front stage side spreading section and that outputs the optical signals that have been subjected to spectrum spreading processing after subjecting them to code division multiplexing; and

a second code switching section comprising:

a rear stage side branching section coupled with said front stage side combining section and that branches optical signals that have been subjected to spectrum spreading processing input from said front stage side combining section to branched optical signals and respectively outputs said branched optical signals;

a rear stage side spectrum despreading section coupled with this rear stage side branching section, that performs respective spectrum despreading processing on the branched optical signals with spreading code respectively set from outside and that respectively outputs optical signals subjected to spectrum despreading processing;

a rear stage side spreader section coupled with said rear stage side spectrum despreading section, that performs respective spectrum spreading processing on said optical signals that have been subjected to spectrum despreading processing with a fixed spreading code and that respectively outputs optical signals subjected to spectrum spreading processing having said respectively fixed spreading codes; and

a rear stage side combining section coupled with said rear stage side spreading section and that outputs to a respective output port the optical signals that have been subjected to spectrum spreading processing after subjecting them to code division multiplexing.

26. The optical path switching device according to claim 25, comprising a wavelength conversion section that outputs input optical signals that have been subjected to spectrum despreading processing after converting their wavelength, between said rear-stage side spectrum despreading section and said front stage side spreader section.

27. The optical path switching device according to claim 25, further comprising a wavelength multiplexing path switching section (WDM-XC) coupled between an input circuit and output circuit and coupled between an input port of said second code switch and an output port of said first code switch.

28. The optical path switching device according to claim 27, wherein said wavelength multiplexing path switching section comprises a wavelength demultiplexing section (AWG) coupled with said input circuit, a wavelength multiplexing section (AWG) coupled with said output circuit, and an optical switch having a main input port coupled with said wavelength demultiplexing section and a main output port coupled with said wavelength multiplexing section and an auxiliary output port coupled with an input port of said

second code switch and an auxiliary input port coupled with an output port of said first code switch.

29. The optical path switching device according to claim 25, comprising an optical code division multiplexing transmitting and receiving portion (OCDM-Tx/Rx) coupled between an output port and said second input port of said first code switch, and arranged so as to be capable of performing introduction and extraction of spreading code with respect to a router.

30. An optical path switching device comprising:

a branching section that branches an optical code division multiplexing signal input from an input circuit into branched optical signals and respectively outputs said branched optical signals;

a first intermediate stage coupler section coupled with said branching section;

a spectrum despreading section coupled with the first intermediate coupler section that respectively subjects said branched optical signals to spectrum despreading processing with spreading code respectively set from outside and that respectively outputs said optical signals that have been subjected to spectrum despreading processing;

a second intermediate stage coupler section coupled with said spectrum despreading section;

a spreading section coupled with said second intermediate stage coupler section that respectively subjects

said optical signals that were subjected to spectrum despreading processing to spectrum spreading processing with spreading code respectively set from outside and that respectively outputs said optical signals that have been subjected to spectrum spreading processing having said respective spreading codes; and

a combining section coupled with said spreading section that performs code division multiplexing on said optical signals that have been subjected to spreading processing and respectively outputs these to an output circuit.

31. The optical path switching device according to claim 30, wherein said spectrum despreading section includes a plurality of spreaders in a portion of which spectrum despreading processing is selectively interrupted while in the remaining portion of which spreading code is selectively set and

said spectrum spreading section includes a plurality of spreaders whose spreading codes are selectively set.

32. The optical path switching device according to claim 30, comprising a tunable wavelength converter section between said second intermediate stage coupler section and said spectrum spreading section.